

FIG. 1

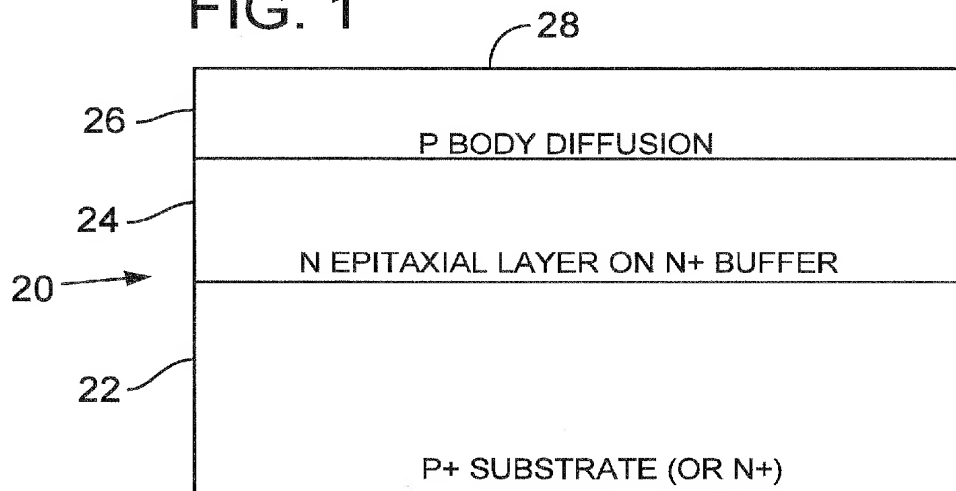
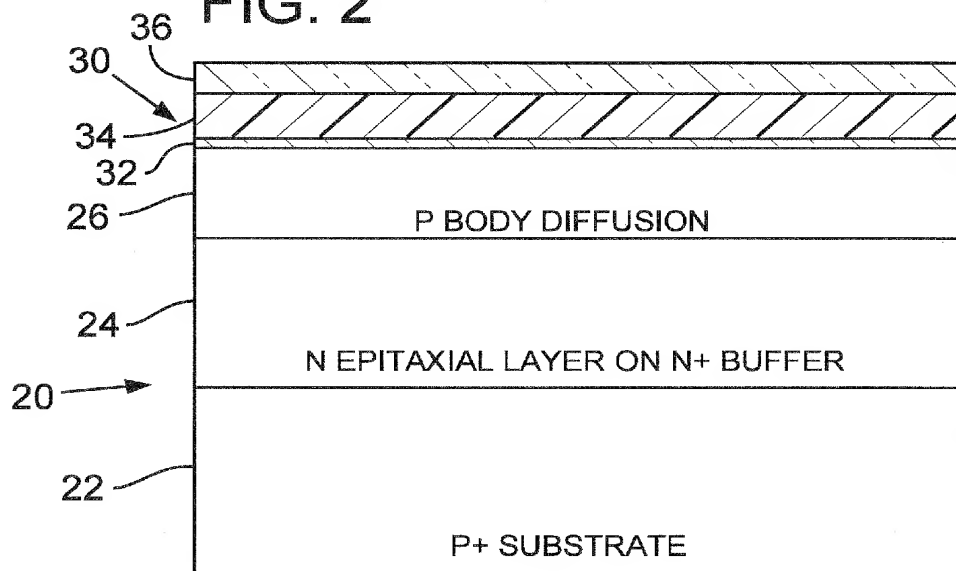
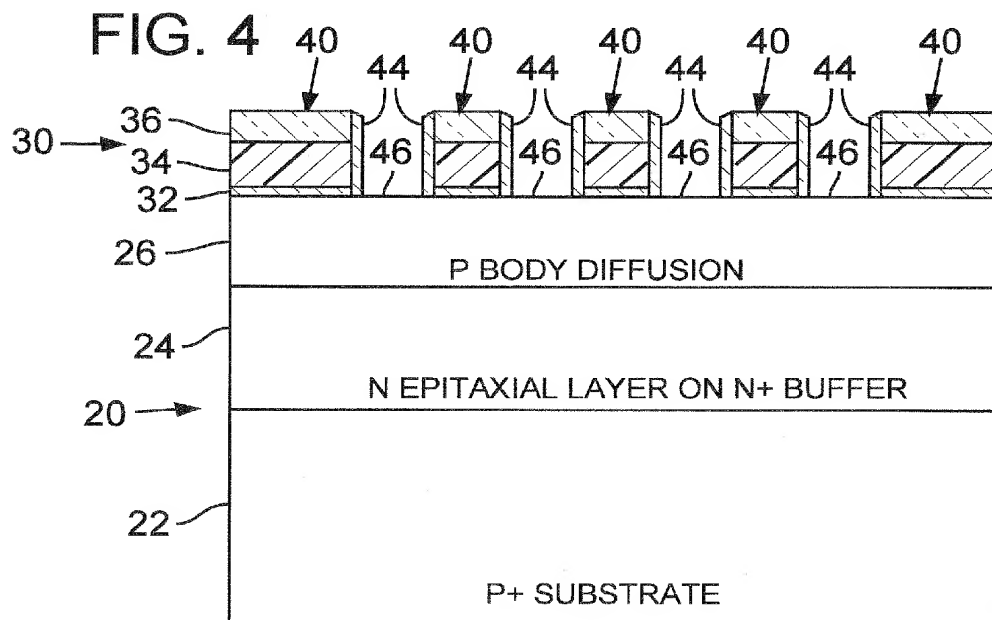
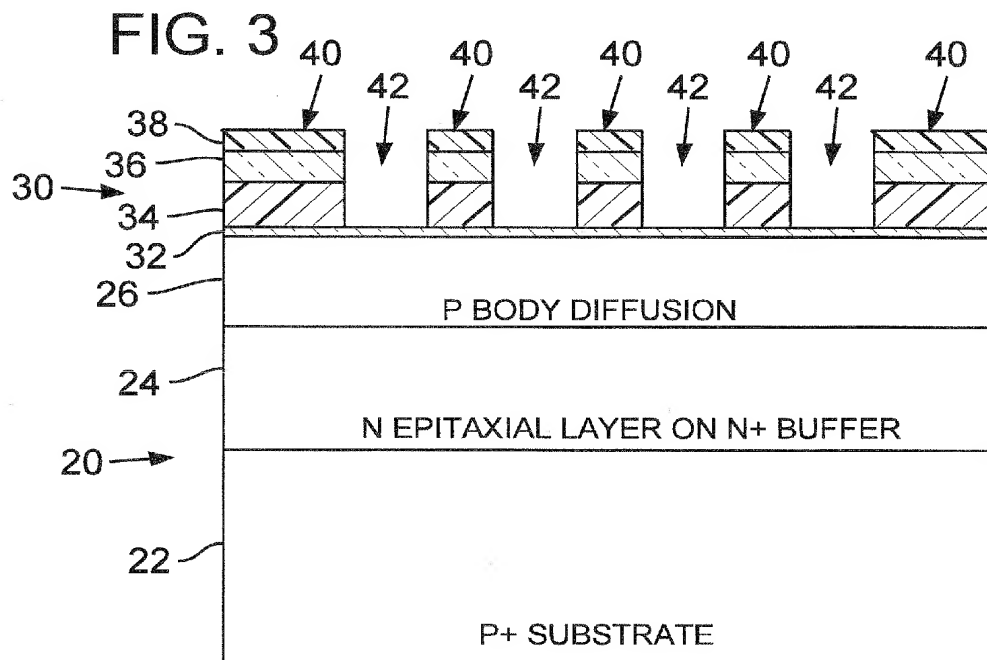


FIG. 2





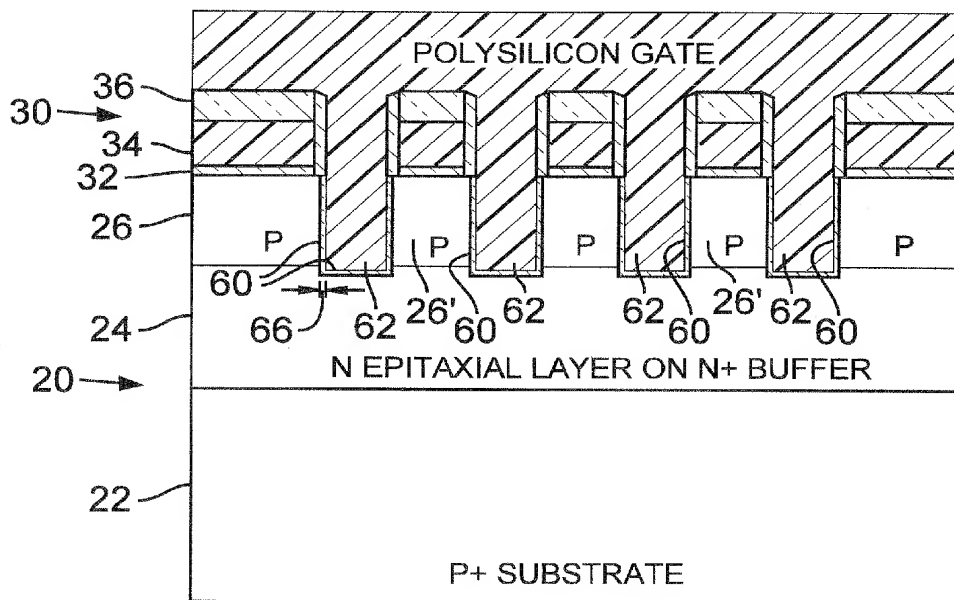
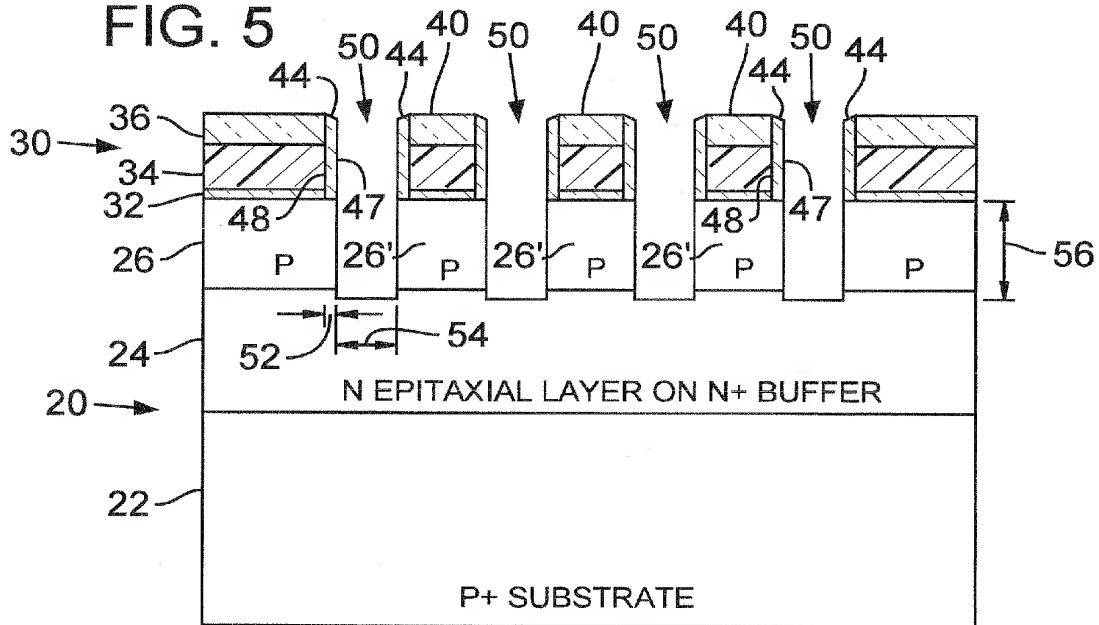


FIG. 6B

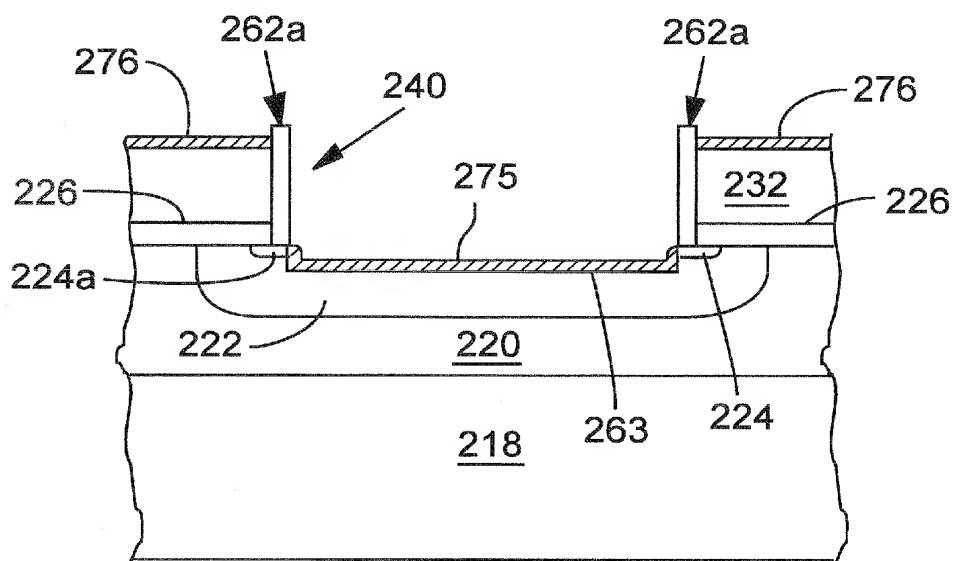
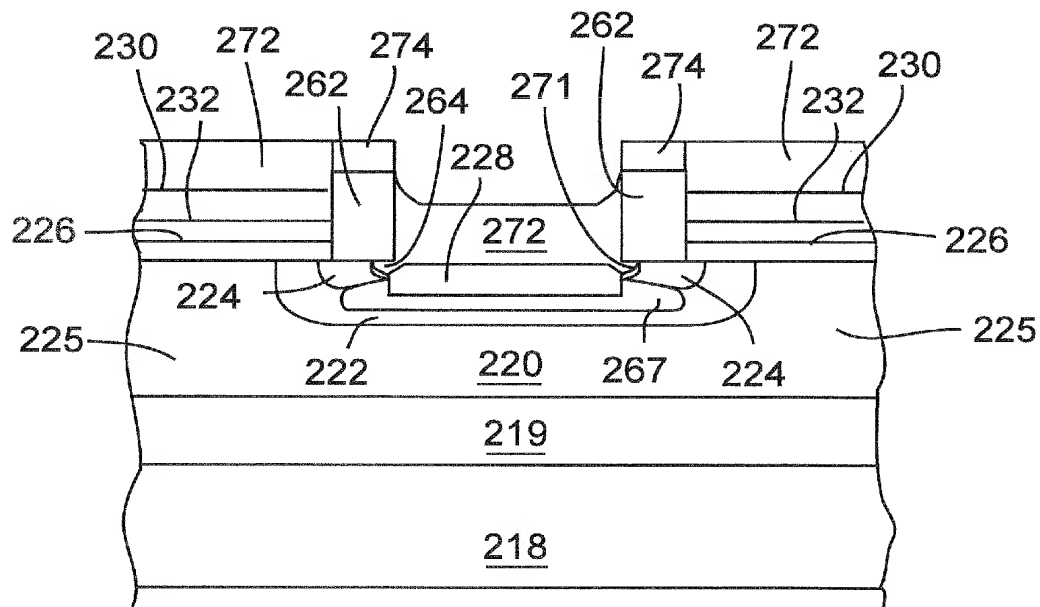


FIG. 6C



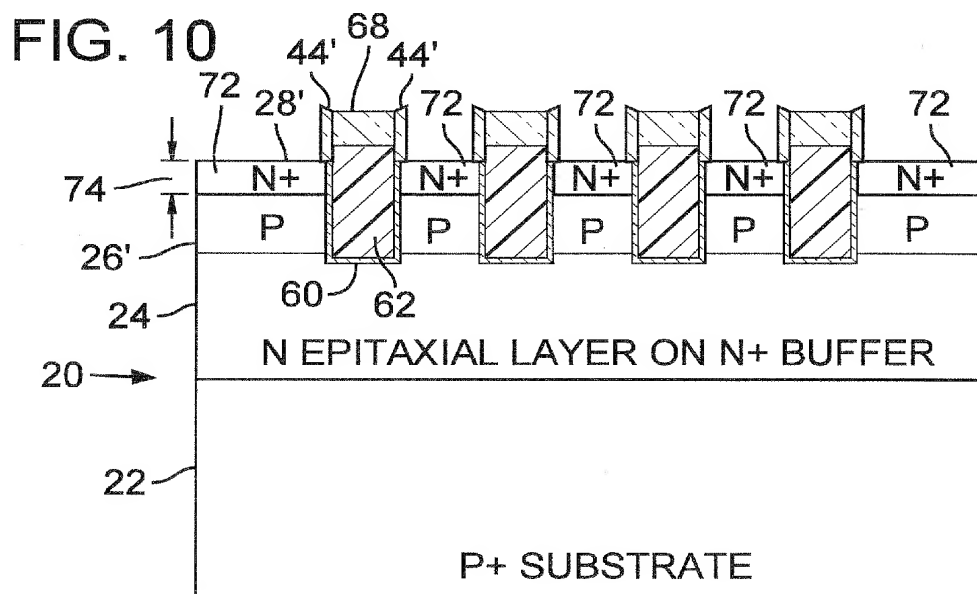
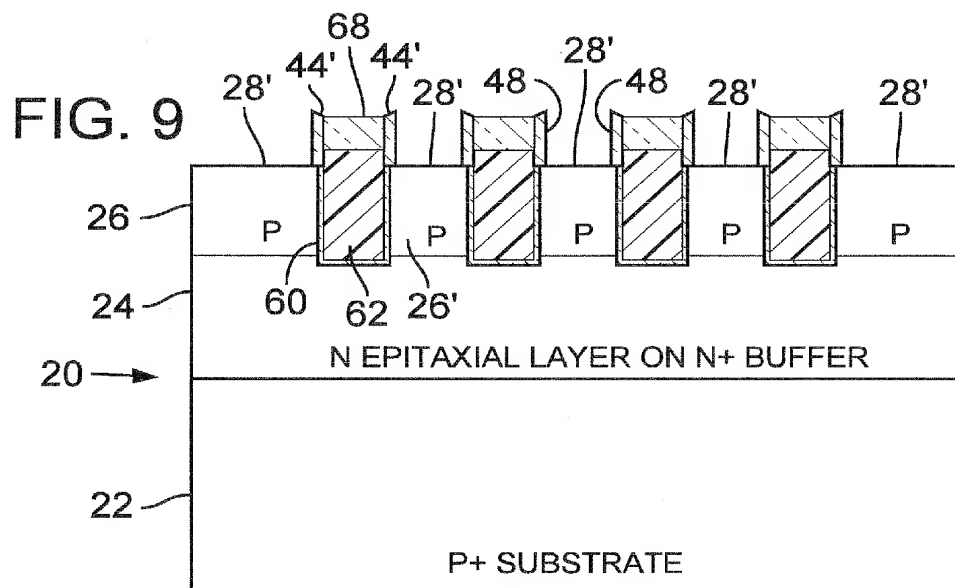


FIG. 11

FIG. 11 is a cross-sectional view of a semiconductor device. The device is built on a P+ SUBSTRATE (22). An N EPITAXIAL LAYER ON N+ BUFFER (24) is formed on the substrate. The device features a series of vertical structures (68) with N+ regions (44') and P regions (48). The structures are separated by N+ regions (86) and P regions (90). The device is built on a P+ substrate (22) with an N epitaxial layer (24) and an N+ buffer (26). Dimensions 82 and 84 are indicated.

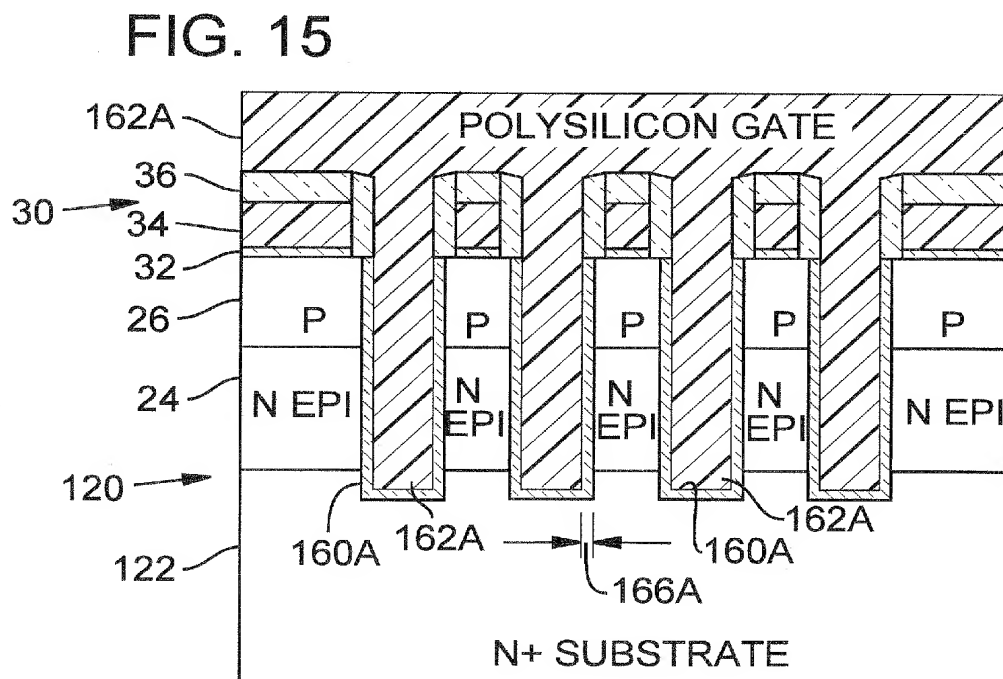
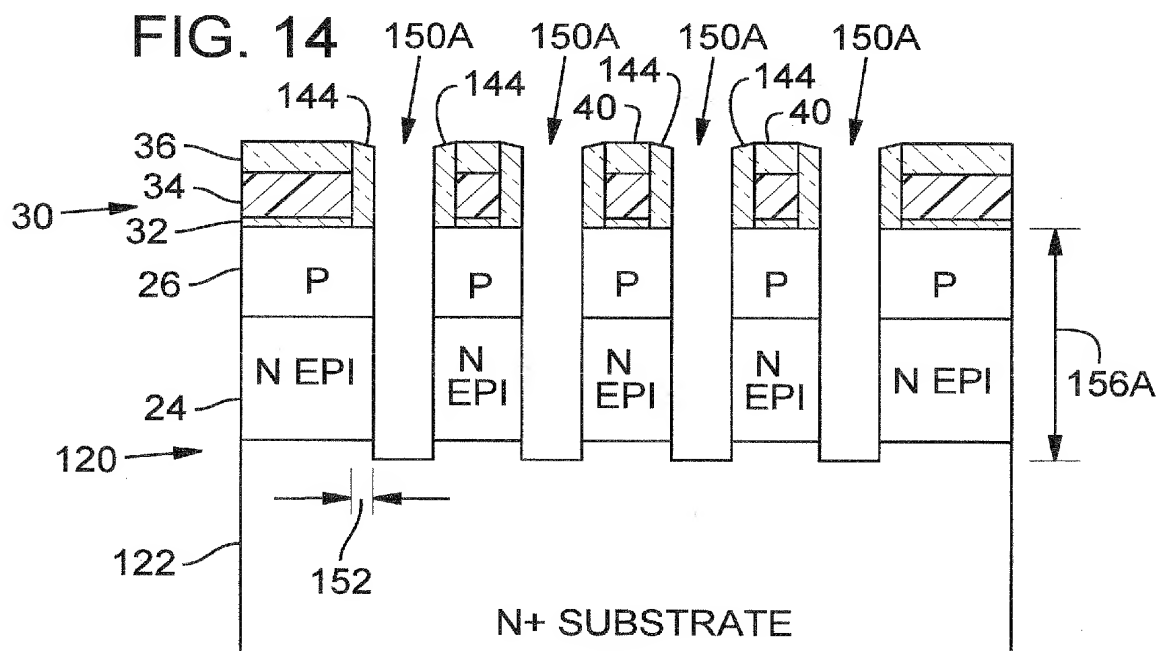


FIG. 16

150B 144 150B 150B 150B

36 30 34 32 26 P 24 N EPI 120 122 160A 162A 156B

N+ SUBSTRATE

A cross-sectional view of a semiconductor device. The device features a series of vertical structures on an N+ SUBSTRATE. Each structure consists of a central N EPI region, a P region, and a top layer labeled 162B. The structures are separated by a material labeled 160A. A horizontal layer labeled 160B is positioned below the N EPI regions. A gate structure labeled POLYSILICON GATE is located above the P regions. A layer labeled 122 is at the bottom, and a layer labeled 120 is above it. A layer labeled 24 is between the 160B and 160A layers. A layer labeled 26 is between the 160A and 162B layers. A layer labeled 32 is between the 162B and 34 layers. A layer labeled 36 is between the 34 and 162B layers. A layer labeled 66 is between the 162B and 34 layers. A layer labeled 30 is between the 34 and 162B layers.

A cross-sectional view of a semiconductor device. The device features a series of vertical trench isolation structures (160A) that separate active regions. The active regions consist of a P-type layer (P) and an N-type epitaxial layer (N EPI). The N EPI layer is further divided into a top portion (160B) and a bottom portion (162B). The P-type layer is labeled with 'P' and the N EPI layer with 'N EPI'. The trench isolation structures are labeled 160A and 162A. The device is built on an N+ SUBSTRATE. The top surface is covered by an ISOLATION OXIDE layer. Various layers and features are labeled with numbers: 68, 36, 34, 32, 26, 160B, 162B, 24, 120, and 122. A dashed line indicates a cross-section through the device.

[illegible]

FRONTSIDE METALLIZATION

94

N+

26''

262B

260B

POLY 1 & THICK OX

24

20

22

98

N EPITAXIAL LAYER ON N+ BUFFER

260A

262A

BACKSIDE METALLIZATION

P+

P

256

FIG. 22

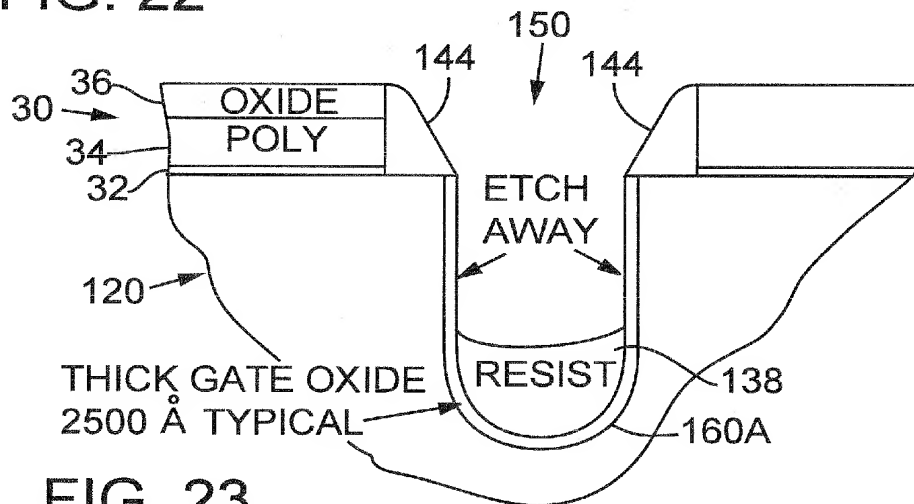


FIG. 23

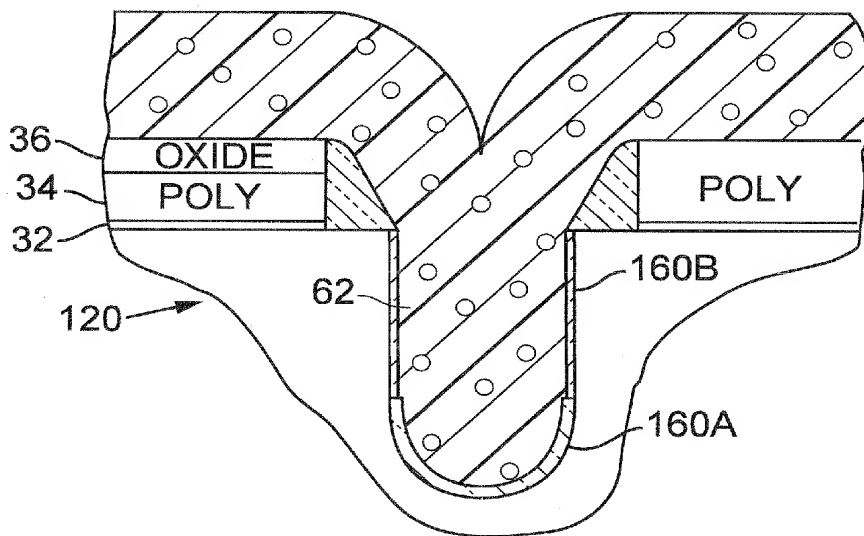


FIG. 24

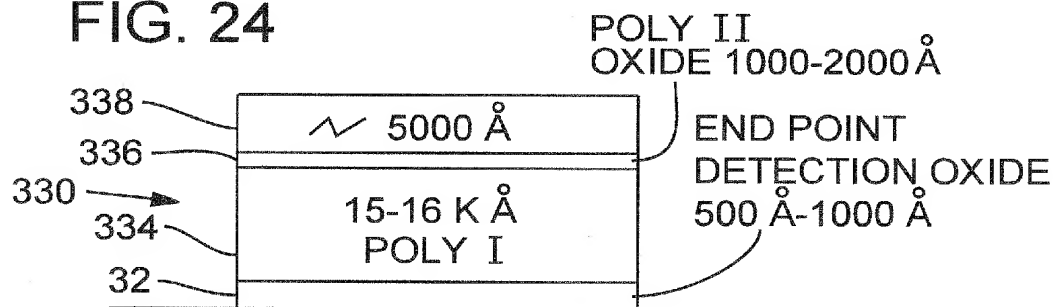
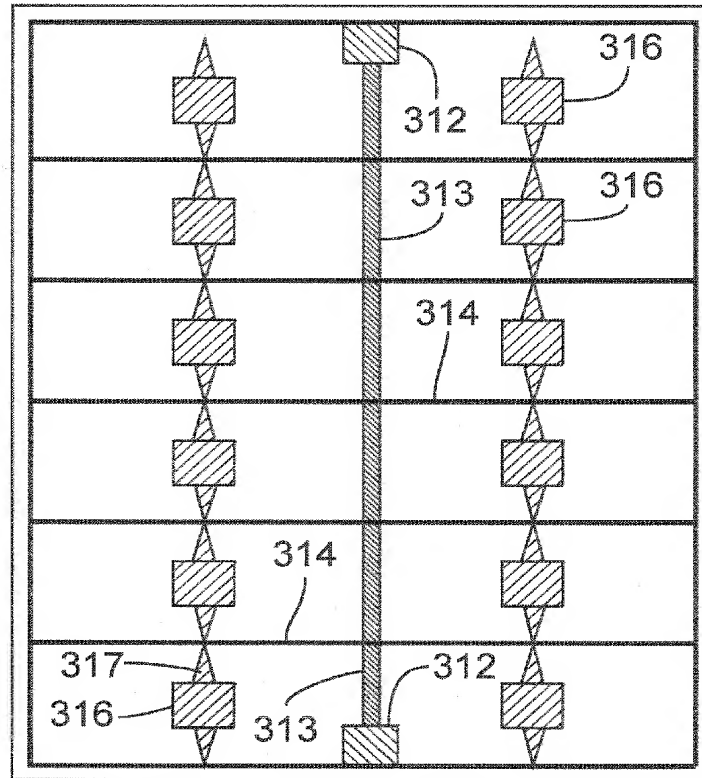






FIG. 25



-  60 X 25 MIL SOURCE PAD
-  25 X 35 MIL GATE PAD
-  MAIN GATE BUS 4MIL WIDE
-  SECONDARY GATE BUS 2MIL WIDE